

SUPPLEMENTARY STUDIES ON ANT LARVAE: MYRMICINAE (HYMENOPTERA: FORMICIDAE)

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Abstract.—The larvae of six species of ants in the genera *Acromyrmex*, *Orectognathus*, *Oxyopomyrmex*, *Procryptocerus*, *Rogeria* and *Zacryptocerus* are described. The larva of *Oxyopomyrmex* is characterized for the first time. Included also are references to the larvae of myrmicine ants found in the literature.

In our 1976 memoir we discussed the limited practical utility for myrmecologists afforded by the study of ant larvae: (1) to detect contamination; (2) to distinguish brood from prey of army ants; and (3) to distinguish parasite and host larvae in mixed colonies. Now we can add a fourth: to distinguish the instars in larval development. This seems to be especially important for the students of caste determination. They need to know when a stimulus must be applied to cause (or prevent) differentiation, as well as the kind and/or strength of the stimulus.

We have always described immature larvae when we had them, which was not often, but in this article we are fortunate in having 3 or 4 stages for 4 of the 6 species described. We do not like to call them instars unless certain conditions are fulfilled: an egg ready to hatch will reveal the characters of the first instar; a first instar ready to moult will contain a fully formed second instar; etc.; etc.; until we find a semipupa (=prepupa) which will have all the characters of the last instar except the shape. But such favorable specimens are rarely found; hence we like to get a large number of larvae. We hope that our descriptions will eventually enable students of living larvae to recognize instars by characters other than size.

Acromyrmex introduces another problem for highly polymorphic ants: how to distinguish mature larvae of the smallest workers from the younger instars of the largest workers.

The terms used below for describing profiles and mandible shapes are defined in our 1976 memoir. When we refer below to our own papers we give only the year and sometimes the page.

TRIBE MYRMICINI

Genus *Myrmica* Latreille

Myrmica scabrinodis Nylander & *M. laevinodis* Nylander

Hinton, 1951:155. The larvae of *Maculinea* (= *Lycaena*) *arion* L. [Lepidoptera: Lycaenidae] feed upon the larvae of these ants, consuming them entirely. The larva of *M. alcon* F. (p. 156) also feeds upon the larvae of these ants, sucking out the juices.

TRIBE PHEIDOLINI
Genus *Messor* Forel
Messor aciculatus F. Smith

Onoyama, 1981:630. A table giving the minimum, maximum and mean duration in days of each stage and instar. The means for stages are: egg 19.4, 1st instar 4, 2nd instar 4.6, 3rd instar 19.2, prepupa 4.7, pupa 13.4, total 69.3.

Onoyama, 1982. The 3 instars are to be distinguished by abundance and length of hairs. Instars illustrated in detail.

Genus *Oxyopomyrmex* Ern. André

Profile aphaenogastroid. Body and head hairs very few, short, unbranched, with frayed tip. Labrum small, bilobed. Mandible pogonomymecoid, with only one medial tooth; medial surface of base spinulose.

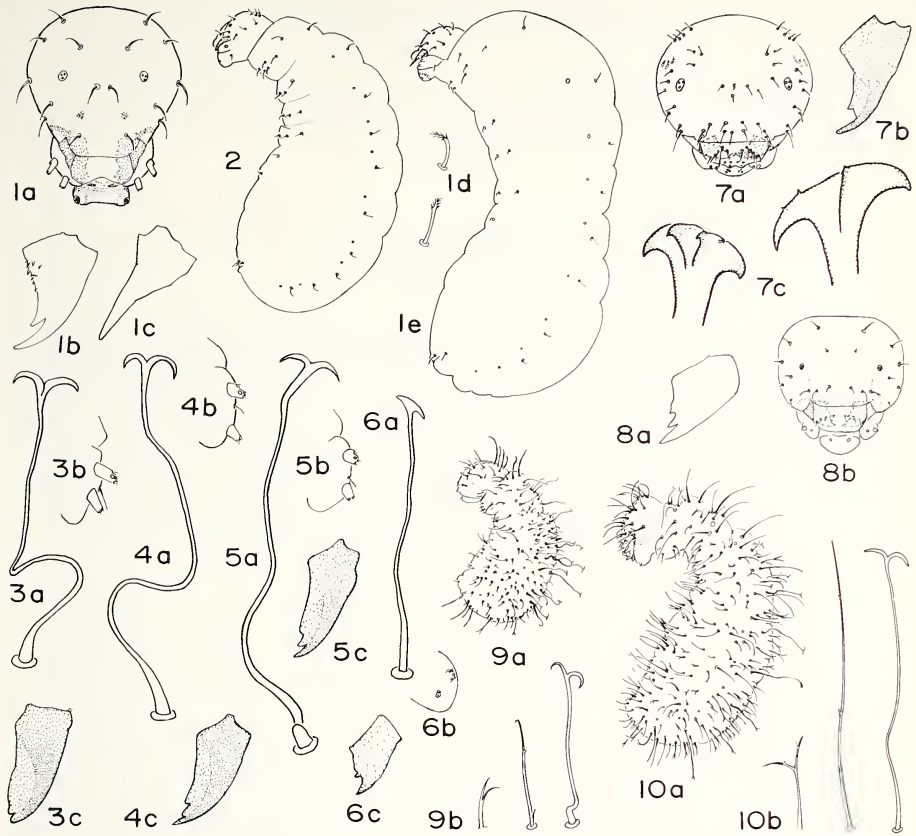
Oxyopomyrmex sp.

Figs. 1, 2

Mature larva. Length (through spiracles) about 2.4 mm. Profile aphaenogastroid. Wing, leg and gonopod vestiges present. Anus posteroventral. Somites indistinct. Spiracles on T2 0.015 mm in diameter; remainder decreasing slightly posteriorly. Integument sparsely spinulose, the spinules minute and isolated. Body hairs few; with stout base and frayed tip. Of 2 types: (1) 0.025–0.05 mm long, with slightly curved tip; 1 on each dorsolateral surface of T1-AV and 4 on venter of AX; (2) 0.012–0.025 mm long, bent as much as 90°, distributed as follows on venter: T1 14, T2-AI 4 each, AII 2, AIII-AX none. Cranium subcircular. Antennae at midlength of cranium, small; with 3 sensilla each. Head hairs 0.025–0.038 mm long, few (about 14), stout, with slightly curved base and frayed tip. Labrum bilobed; width 1.5 times length; anterior surface with about 10 sensilla; ventral surface of each lobe with 1 isolated and a cluster of 2 or 3 sensilla; posterior surface spinulose, the spinules minute and in short arcuate rows. Mandible heavily sclerotized; pogonomymecoid but with only 1 medial tooth; medial border of base spinulose. Maxilla with apex conoidal; palp a skewed paxilla with 5 (4 apical and 1 lateral) sensilla; galea digitiform with 2 apical sensilla. Labium spinulose, the spinules minute and in short subtransverse rows; palp a slight elevation with 5 sensilla; opening of sericteries a small slit. Hypopharynx spinulose, the spinules minute and in short straight or arcuate subtransverse rows.

Immature larva. Length (through spiracles) about 1.8 mm. Similar to mature larva except as follows. Neck shorter and more slender. About 6 differentiated somites. Integument on venter of anterior somites with spinules in short transverse rows, sparse and isolated elsewhere. Body hairs of only type 1 and 0.012–0.05 mm long; 8 on AI, 6 on AII, 2 on AVII.

Material studied. 9 larvae from Sidi Amira, Forêt Maôra, Morocco, 14-V-1984, courtesy of X. Espadaler.



Figs. 1-10. 1 and 2. *Oxyopomyrmex* sp. 1. Mature larva. a, Head in anterior view, $\times 120$; b, left mandible in anterior view, $\times 555$; c, left mandible in lateral view, $\times 555$; d, 2 body hairs, $\times 267$; e, larva in side view, $\times 39$. 2. Immature larva in side view, $\times 39$. 3-6. *Rogeria scandens*. 3. Mature larva. a, Anchor-tipped hair, $\times 363$; b, left maxilla in anterior view, $\times 168$; c, left mandible in anterior view, $\times 168$. 4. Immature larva. a, Anchor-tipped hair, $\times 363$; b, left maxilla in anterior view, $\times 168$; c, left mandible in anterior view, $\times 168$. 5. Young larva. a, Anchor-tipped hair, $\times 363$; b, left maxilla in anterior view, $\times 168$; c, left mandible in anterior view, $\times 168$. 6. Very young larva. a, Anchor-tipped hair, $\times 363$; b, left maxilla in anterior view, $\times 168$; c, left mandible in anterior view, $\times 168$. 7. *Zacryptocerus laminatus christopherseni*, immature larva. a, Head in anterior view, $\times 41$; b, left mandible in anterior view, $\times 128$; c, anchor-tipped hair with "claws," $\times 339$. 8. *Procryptocerus scabriusculus*, young larva. a, Left mandible in anterior view, $\times 145$; b, head in anterior view, $\times 51$. 9 and 10. *Orectognathus echinus*. 9. Very young larva. a, Larva in side view, $\times 21$; b, 3 types of body hairs, $\times 133$. 10. Young larva. a, Larva in side view, $\times 21$; b, 3 types of body hairs, $\times 133$.

Genus *Pheidole* Westwood*Pheidole bicarinata* Mayr

D. E. Wheeler, 1982. Four larval instars may be distinguished by mandibles, hair pattern and spiracle sizes. SEM photographs of the 4 instars (p. 22), larval hairs (p. 27), sexual larvae (p. 32) and internal anatomy (p. 35).

TRIBE CREMATOGASTRINI

Genus *Crematogaster* Lund*Crematogaster scutellaris* (Olivier)

Casevitz-Weulersse, 1983 and 1984. Three instars are described and illustrated by sketches and photographs, with special reference to the lateral expansions in some larvae. The instars are differentiated by size, pilosity and diameter of mesothoracic spiracles. The author's hypothesis: "these larvae are so abundantly fed that they acquire dilatations which may be compared to the special organs named 'exudatoria' by Wheeler (1918); these larvae may represent a 'stock' of future queens. The mechanism of formation of the dilatations as well as factors that influence the choice of the larvae that will be abundantly fed are as yet unknown" (1984:131).

TRIBE PHEIDOLOGETINI

Genus *Paedalgus* Forel*Paedalgus termitolestes* Wheeler

Wheeler, 1918:301-302, figure 5. The text is essentially the same as the following; figure 43 is a repetition of figure 5

Wheeler, 1922:179-180, figure 43. The larvae are "white, nearly spherical, with short neck, small head, and very feebly developed mouth-parts, indicating that they are fed by the tiny workers with regurgitated liquid food. They are not 'glabres,' as Santschi described the larvae of *P. infimus*, but covered uniformly with short, stiff, sparse hairs, each of which has two recurved branches (Fig. 43a and b). Even in alcohol, the larvae cling compactly together in masses by means of these hooks. When stained and cleared, the larvae are seen to possess unusually voluminous salivary glands. The youngest individuals, scarcely 0.2 mm. long, have the receptacle full of a clear secretion (Fig. 43a). In older larvae (Fig. 43b), the secretion after dehydration forms great masses in the receptacles and lumen of the glands. As these organs are not used in spinning a cocoon, it is very probable that the secretion . . . is elaborated and used as a food for the workers (trophallaxis)."

TRIBE LEPTOTHORACINI

Genus *Leptothorax* Mayr*Leptothorax melas* Espadaler et al.

Espadaler et al., 1984: "Big larvae are present in overwintering brood and develop usually as queens but can also grow into workers." Outlines of larvae.

Leptothorax obturator W. M. Wheeler

Wheeler, 1903:252. "The larvae are of a peculiar greenish tint."

Genus *Rogeria* Emery
Rogeria scandens (Mann)
Figs. 3-6

Mature larva. Length (through spiracles) about 2.8 mm. Profile pheidoloid. Similar to *R. procera* (1973:74) except as follows. Body hairs of 3 types: (1) about 0.04 mm long, simple; (2) 0.025-0.1 mm long, with bifid or multifid tip; (3) about 0.25 mm long, anchor-tipped, with sinuous shaft, 4-6 in a row across dorsum of each T2-III. Antennae at midlength of cranium. Head hairs 0.025-0.4 mm long, simple or with bifid tip. Labrum with anterior surface spinulose, the spinules coarse and isolated medioventrally, 6 isolated hairs about 0.013 mm long, and 4 isolated sensilla; each half of posterior surface with 4 isolated and a cluster of 3 sensilla. Mandible ectatomoid; heavily sclerotized; medial border of blade erose. Maxilla lobose; palp a short peg with 5 (3 apical and encapsulated, 1 lateral with a spine about 0.006 mm long and 1 basal with a hair about 0.013 mm long) sensilla.

Immature larva. Length (through spiracles) about 1.6 mm. Similar to mature larva except as follows. Body hairs shorter: (1) 0.025-0.05 mm long, few on venter of thorax; (2) 0.013-0.1 mm long, mostly bifid; (3) 0.2 mm long. Head hairs fewer; about 40. Mandible with apical and subapical teeth short.

Young larva. Length (through spiracles) about 1.2 mm. Similar to mature larva except as follows. Entire integument spinulose. Body hairs (1) 0.025-0.05 mm long, few, mostly on venter of thorax; (2) 0.025-0.075 mm long, long- to short-bifid; (3) about 0.2 mm long with a slightly curved shaft. Head hairs few (about 36). Labrum with fine spinules. Maxillary palp short and stout.

Very young larva. Length (through spiracles) about 0.87 mm. Similar to mature larva except as follows. Profile club-shaped. With minute spinules on venter of thorax. Body hairs (1) 0.006-0.03 mm long, on most somites; (2) 0.018-0.075 mm long, few; (3) about 0.125 mm long, with short nearly straight shaft. Head hairs 0.013-0.04 mm long, mostly simple, a few bifid-tipped. Labrum with a few minute spinules on anterior surface, hairs about 0.006 mm long. Mandible short and triangular; apex shorter; subapical teeth smaller; feebly sclerotized. Maxilla appearing adnate; palp a rounded knob with 5 sensilla; galea a slight elevation with 2 sensilla. Labium with palp represented by a cluster of 5 sensilla.

Material studied. 9 larvae from Barro Colorado Island, Panama, 19-IX-1983, courtesy of Diana E. Wheeler.

TRIBE TETRAMORIINI

Genus *Tetramorium* Mayr*Tetramorium caespitum* (Linnaeus)

Hinton, 1951:156. The larva of *Maculineaalcon* F. [Lepidoptera: Lycaenidae] prey upon the larvae, sucking out the juices.

Poldi, 1967: The author reared workers from eggs using as food only nutritive eggs. Figure 1 on p. 325 is an outline of a larva in profile.

TRIBE CEPHALOTINI

Genus *Procryptocerus* Emery*Procryptocerus scabriculus* Emery

Fig. 8

Mature larva (?). Length (through spiracles) about 4 mm. Similar to *P. adlerzi* (1973:79) except as follows. Head on anterior end. Body hairs of 4 types: (1) 0.003–0.13 mm long, longest on posterior surface of AX; (2) 0.025–0.1 mm long, with straight shaft and frayed tip, most numerous on T1; (3) about 0.2 mm long, anchor tipped, 4 in a row across dorsum of each AI-AIV; (4) about 0.05 mm long, with slender flexuous tip, few, on venter of T1. Integument on venter of T1 and T2 with few minute spinules. Cranium transversely subelliptical. Head hairs numerous (about 100). Of 2 types: (1) 0.025–0.05 mm long, with long flexuous tip; (2) 0.038–0.063 mm long, with frayed tip, longest on lower margin of clypeus. Labrum trapezoidal; anterior surface with a row of 6 hairs 0.019–0.03 mm long, simple, slightly curved, 10 sensilla on and near ventral border; posterior surface with 6 isolated and a cluster of 3 sensilla.

Immature larva. Length (through spiracles) about 2.5 mm. Similar to mature larva except as follows. Body hairs of only 3 types: (1) similar to mature larva; (2) 0.012–0.1 mm long; (3) about 0.175 mm long; (4) lacking. Head hairs numerous (about 75); (1) shorter (0.006–0.024 mm long). Labial palp a slight knob with 5 sensilla.

Young larva. Length (through spiracles) about 1.7 mm. Similar to immature larva except as follows. Body nearly same diameter throughout. Head on anterior end. Body hairs few. Of 3 types: (1) 0.013–0.08 mm long, on dorsal and lateral surfaces, with bifid to multifid tip; (2) 0.006 mm long, simple, on all surfaces; (3) about 0.11 mm long, anchor-tipped, 4 on dorsum of each AI-AVI, 2 on AVII. Head hairs few (about 20); of only 1 type: 0.013–0.038 mm long, with frayed tip. Mandible more slender and with larger teeth. Maxilla appearing adnate, lobose; palp an irregular knob with 5 sensilla; galea a slight elevation with 2 sensilla. Labial palp an irregular knob with 5 sensilla.

Material studied. 8 larvae from Costa Rica, 25-VIII-1983, courtesy of Diana E. Wheeler.

Genus *Zacryptocerus* Ashmead*Zacryptocerus laminatus christophersenii* (Forel)

Fig. 7

Immature larva. Length (through spiracles) about 5 mm. Similar on *Z. minutus* (called *Paracryptocerus minutus* 1954:155). Head on anterior end; body club-shaped. Leg vestiges prominent; gonopod vestiges of AIX distinct; wing vestiges distinct. Integument densely spinulose, the spinules minute and in short to long subtransverse rows. Body hairs: (1) 0.01–0.075 mm long, simple, most numerous on T1, on all surfaces of T1 and T2 and venter of T3, AI and AII, decreasing in number posteriorly; (2) about 0.225 mm long, anchor-tipped (some with "claws"), 4–6 in a transverse row across dorsum of each T3 and AI-AV. An integumentary structure (ridges and/or grooves?) dorsolateral to each antenna. Antennae just below midlength of cranium. Head hairs numerous (about 50), short (0.025–0.075 mm long), simple. Ventral

border of labrum feebly 4-lobed; posterior surface with sparse transverse rows of spinules. Maxilla appearing adnate; palp a low irregular knob with 5 sensilla; galea a small knob with 2 sensilla. Labium with a few transverse rows of minute spinules; palp a slight elevation with 5 sensilla.

Material studied. 2 larvae from Panama, 2-III-1983, courtesy of Diana E. Wheeler.

TRIBE BASICEROTINI

Genus *Octostruma* Forel

Octostruma inca Brown and Kempf

Correction. Wheeler and Wheeler, 1977:600–601. Change the mandible shape to pogonomyrmecoid.

TRIBE DACETINI

Genus *Orectognathus* F. Smith

Orectognathus echinus Taylor and Lowery

Figs. 9, 10

Mature larva. Length (through spiracles) about 5 mm. Similar to *O. clarki* (1954: 126) except in the following details. Body hairs (1) 0.1–0.35 mm long; (2) 0.065–0.3 mm long, with few to many denticles of various lengths, on all somites; (3) about 0.375 mm long, 4 in a row across dorsum of each AII-AV or -AVI. Antenna with 3 or 4 sensilla each with a prominent spinule. Head hairs longer (0.05–0.2 mm long). Labrum with 3 hairs about 0.012 mm long; spinules on posterior surface fewer and longer. Mandible with base roughened with transverse ridges. Maxillary palp digitiform with 5 (2 apical, 2 subapical and 1 lateral) sensilla.

Immature larva. Length (through spiracles) about 3.4 mm. Similar to mature larva except as follows. Abdomen more swollen. Anus with anterior and posterior lips. Clypeus with subtransverse rows of minute spinules. Each half of labrum with anterior surface bearing 3 or 4 hairs about 0.09 mm long; ventral surface with 1 isolated and 2 contiguous sensilla; posterior surface spinulose, the spinules minute and in short to long transverse rows. Labium transversely subelliptical.

Young larva. Length (through spiracles) about 2.9 mm. Similar to immature larva except as follows. Neck more slender. Body hairs: (1) 0.075–0.175 mm long; (2) 0.075–0.4 mm long; (3) 0.225–0.4 mm long. Antennae at midlength of cranium.

Very young larva. Length (through spiracles) about 1.6 mm. Body short, stout, thorax curved ventrally. Diameter of T2 spiracle 0.013 mm, remainder decreasing slightly posteriorly. Integument of AX with minute spinules in short transverse rows. Body hairs: (1) 0.018–0.15 mm long, slightly curved, smooth or with minute denticles, mostly on ventral surface; (2) about 0.05 mm long, slightly to deeply bifid, some with denticles, on lateral and dorsal surfaces; (3) about 0.2 mm long, anchor-tipped [hairs broken] at least on T3-AVI. Antenna a small knob with 3 sensilla each with a long spinule. Head hairs 0.08–0.18 mm long, simple. Mandible feebly sclerotized, with 1 apical and 2 short medial teeth. Galea a short cone with 2 apical sensilla.

Material studied. 6 larvae from Mt. Missimi, 1,550 m, Papua New Guinea; 30-V-1980, coll. Y. D. Lubin, courtesy of R. R. Snelling.

Orectognathus versicolor Donisthorpe

Carlin, 1981:223. Small photograph of larvae.

Hölldobler, 1981:246. Small photographs of larvae and (p. 248) of worker carrying larva.

TRIBE ATTINI

Genus *Acromyrmex* Mayr

When we were preparing our first publication on Attini (1948) our *Acromyrmex* material consisted of three larvae of *A. lundi* and three of *A. octospinosus*. Presumably the latter were not in good condition for we did not draw a whole larva; furthermore the heads of these two species are generically different. So for 40 years we have had doubts about this genus. Dr. Febvay's generous contribution has stilled our doubts about *A. octospinosus*. Can anyone do as much for *A. lundi*?

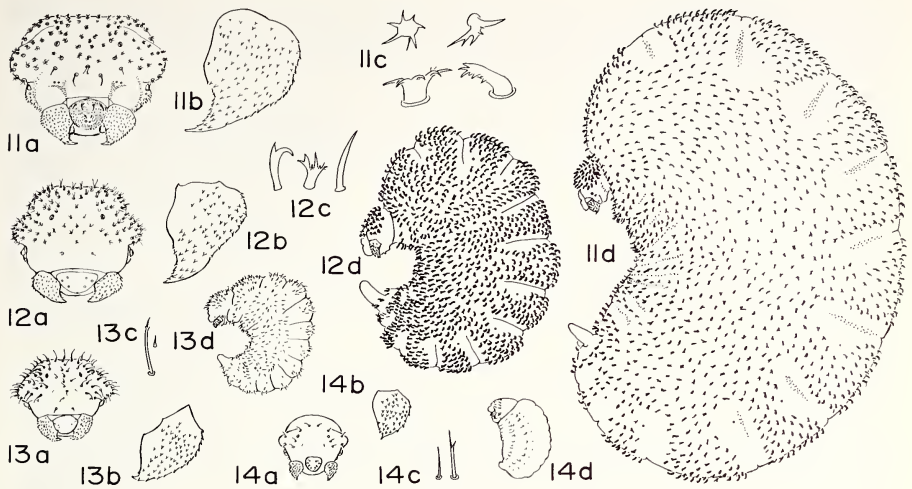
Acromyrmex octospinosus (Reich)

Figs. 11–14

Mature worker larva. Length (through spiracles) 6.5–8.8 mm. Body attoid. Head on ventral surface at a considerable distance from anterior end. Anus ventral and with a digitiform posterior lip. Segmentation indistinct. Leg, wing and gonopod vestiges present. Diameter of T2 spiracle 0.025 mm, remaining spiracles decreasing slightly posteriorly. Intersegmental structures dorsolateral and ventrolateral on thorax and AI-AVI. Integument on all surfaces of posterior somites and venter of anterior somites with minute spinules in transverse rows. Body hairs inconspicuous, moderately numerous, very short (0.025–0.06 mm long), very stout, bent posteriorly, apical margin frayed. Cranium transversely subelliptical, with bulging genae. Antenna a small pit with 3 sensilla at the bottom; at upper fourth of cranium. Head hairs abundant (about 120), but lacking on lower fourth; similar to body hairs. Labrum transversely subelliptical; anterior surface with 4 simple hairs; entire anterior surface with rather coarse isolated spinules and about 7 sensilla each with a minute spinule; ventral border with isolated spinules; posterior surface spinulose, the spinules in short to long transverse rows. Mandible attoid; apical tooth moderately sclerotized; no medial teeth; all surfaces with numerous large sharp-pointed denticles. Maxilla very long and narrow, apex round-pointed; integument sparsely spinulose; palp a skewed sclerotized frustum with 2 apical and 1 basal sensilla; galea a sclerotized peg with 2 apical sensilla. Labium spinulose, the spinules minute and in numerous arcuate rows; palp a low knob with 5 sensilla; opening of sericteries a transverse slit in a depression. Hypopharynx spinulose, the spinules in rather long subtransverse rows.

Immature larva. Length (through spiracles) 4–4.4 mm. Similar to mature larva except as follows. Segmentation distinct. Diameter of T2 spiracle 0.016 mm. Head hairs slightly less numerous (about 110). Apical tooth of mandible not much larger than denticles. Spinules of hypopharynx in short to long subtransverse rows.

Young larva. Length (through spiracles) 2–2.8 mm. Similar to immature larva except as follows. Profile crescentic; diameter greatest at T3. Anus ventral, with posterior lip forming a short tail. Diameter of T2 spiracle 0.009 mm, remaining



Figs. 11–14. *Acromyrmex octospinosus*. 11. Mature larva. a, Head in anterior view, $\times 44$; b, left mandible in anterior view, $\times 119$; c, body hairs in surface view (top) and side view (bottom), $\times 169$; d, larva in side view, $\times 20$. 12. Immature larva. a, Head in anterior view, $\times 44$; b, left mandible in anterior view, $\times 119$; c, body hairs, $\times 169$; d, larva in side view, $\times 20$. 13. Young larva. a, Head in anterior view, $\times 44$; b, left mandible in anterior view, $\times 119$; c, body hairs, $\times 169$; d, larva in side view, $\times 20$. 14. Very young larva. a, Head in anterior view, $\times 44$; b, left mandible in anterior view, $\times 119$; c, body hairs, $\times 169$; d, larva in side view, $\times 20$.

spiracles decreasing slightly posteriorly. Integument with minute spinules which are isolated or in short rows on all surfaces of AVIII–AX, venter of anterior somites and dorsal surface of abdominal somites. Body hairs moderately numerous, but absent in vicinity of spiracles; of 1 type: 0.006–0.05 mm long, with stout base and multifid tip. Head hairs moderately numerous (about 66), short (0.013–0.05 mm long), ranging from slender to stout, with multifid tip. Labrum with anterior and ventral surfaces sparsely spinulose, the spinules small and sharp-pointed; posterior surface spinulose, the spinules small and isolated ventrally, minute and in short rows dorsally; anterior surface with 6 sensilla; ventral surface with 4 sensilla. Mandible attoid, but with apical portion shorter and denticles with sharper tips. Maxillary palp a sclerotized knob with 4 (3 with a spinule each) apical sensilla; galea a very low feebly sclerotized knob with 2 apical sensilla. Labium with spinules in rows of 4–6; palp a small knob with 5 sensilla; an isolated sensillum between each palp and the opening of the sericteries. Hypopharynx densely spinulose, the spinules minute and in short rows.

Very young larva. Length (through spiracles) about 0.9 mm. Similar to young larva except as follows. Short, plump and slightly curved ventrally; diameter greatest at AIII and AIV. Head on anterior end. Anus with prominent lips, the posterior forming a conspicuous knob. Spiracle of T2 0.003 in diameter, remaining spiracles decreasing in diameter posteriorly. Somites feebly differentiated. Integument spinulose, the spinules rather large and isolated, except a few larger and in short rows on venter of thorax. Body hairs few and short, all ventral to spiracles, none on AIX and AX. Of

2 types: (1) short (0.006–0.038 mm long), simple; (2) 0.013–0.038 mm long, with bifid (rarely multifid) tip. Antennae minute, with 3 sensilla, at upper third of cranium. Head hairs few (about 12) and lacking on lower fourth of cranium. Of 2 types: (1) 0.006–0.025 mm, simple; (2) about 0.025 mm long, with multifid tip. Labrum with all surfaces bearing rather coarse isolated spinules; anterior surface with 6 sensilla, each with a spinule. Mandible feebly sclerotized, attoid but with apical portion shorter than in mature larva. Maxillary palp an irregular knob with 2 small sensilla each bearing a spinule and 1 large and encapsulated; galea an irregular swelling with 2 sensilla. Labium subhemispherical, with numerous short transverse rows of 2 or 3 minute spinules; palp represented by 2 minute sensilla.

Sexual larva. Length (through spiracles) 8.9–10 mm. Similar to mature worker larva.

Material studied. Numerous larvae from Guadeloupe, French West Indies, courtesy of G. Febvay.

Torre-Grossa et al., 1982: Four instars distinguishable by length of hairs and by diameter of peritreme of mesothoracic spiracle. Sexual larvae have a fifth instar.

Febvay and Kermarrec, 1981: "Les adultes dépendent, comme d'autres Hyménoptères . . . des sécrétions larvaires pour la fourniture d'un supplément en acides aminés" (p. 312). "The larval midgut shows a biologically important endopeptidasic activity (chymotrypsin)" (p. 314).

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Received September 23, 1985; accepted March 14, 1986.